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TITLE: FABRIC ATTACHMENT DEVICE

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FABRIC ATTACHMENT DEVICE

BACKGROUND

[0001] This invention relates to a fabric attachment device, and in particular to a fabric attachment device for a furniture component.

[0002] Furniture components such as chairs often have fabric coverings. Fabric provides a softer and more comfortable surface for the user. However, it can be challenging to secure the fabric to the furniture component securely and at a minimal cost. Previous approaches have used trim pieces to secure fabric to a furniture component. However, these previous approaches are labor intensive, unattractive, and/or not adaptable to existing furniture components. Thus, it is desirable to have a device to attach fabric to a furniture component that is inexpensive, easy to attach, and provides an aesthetically pleasing appearance.

SUMMARY

[0003] In one aspect, one embodiment of furniture component includes a base element with an enlarged edge portion and a first securing member. The first securing member includes a channel, and the enlarged edge portion is disposed in the channel. The furniture component also includes a fabric piece disposed around at least a portion of the first securing member. The furniture component also includes a second securing member disposed around the first securing member with the fabric piece secured between the first and second securing members.

[0004] According to another aspect, a method of attaching a piece of fabric to a furniture component is provided. The method includes providing a first securing member comprising a channel and disposing an enlarged edge of a furniture component into the channel. The method also includes disposing a piece of fabric around at least a portion of the first securing member and disposing a second securing member around the first securing member. The piece of fabric is thereby secured between the first and second securing members.

[0005] The present embodiments provide significant advantages over existing fabric attachment devices. The fabric attachment device is inexpensive to manufacture and easy to attach to the furniture component. It provides a secure attachment for the fabric to the furniture component and creates an aesthetically pleasing appearance. Moreover, it is easily attached to existing furniture components and can be removable.

[0006] The foregoing paragraphs have been provided by way of general introduction, and are not intended to limit the scope of the following claims. The presently preferred embodiments, together with further advantages, will be best understood by reference to the following detailed description taken in conjunction with the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

[0007] Figure 1 is a perspective view of a chair with fabric attached to the chair back.

[0008] Figure 2 is an exploded view of a chair back.

[0009] Figure 3 is a cross-sectional view of an embodiment of a first securing member.

[0010] Figure 4 is a cross-sectional view of an embodiment of a second securing member.

[0011] Figure 5 is a cross-sectional view of the first and second securing members shown in Figures 3 and 4 disposed on an edge of a base member.

[0012] Figure 6 is a perspective view of a chair back.

[0013] Figure 7 is a perspective view of a piece of fabric attached to a first securing member.

[0014] Figure 7A is an enlarged, partial view of a piece of fabric attached to a securing member.

[0015] Figure 8 is a perspective view of an embodiment of a second securing member.

[0016] Figure 9 is a partial perspective view of a first and second securing member disposed on an edge of a base member.

[0017] Figure 10 is a partial perspective view of a cover secured to a base member.

[0018] Figure 11 is a rear perspective view of a chair.

[0019] Figure 12 is a cross-sectional view of an embodiment of a first securing member and a piece of fabric disposed around a base member.

[0020] Figure 13 is a cross-sectional view of an embodiment of a first securing member with a piece of fabric disposed thereon.

[0021] Figure 14 is a cross-sectional view of an embodiment of a first securing member with a piece of fabric disposed thereon.

[0022] Figure 15 is a cross-sectional view of an embodiment of a first securing member disposed around a second securing member, with a piece of fabric disposed between the securing members.

[0023] Figure 16 is a cross-sectional view of an embodiment of a first securing member.

[0024] Figure 17 is a cross-sectional view of an embodiment of a second securing member.

[0025] Figure 18 is a cross-sectional view of an embodiment of a first securing member.

[0026] Figure 19 is a cross-sectional view of an embodiment of a second securing member.

[0027] Figure 20 is a perspective view of an embodiment of a first securing member.

DETAILED DESCRIPTION OF THE PRESENTLY PREFERRED EMBODIMENTS

[0028] The term "fabric" is meant to include, without limitation, any materials suitable for covering the surface of a furniture component, and includes for example and without limitation, both natural and synthetic materials, such as cloth, leather, rubber, etc., and combinations thereof.

[0029] The term "furniture component" includes, without limitation, all types of furniture, such as chairs, sofas, couches, desks, screens, workspace panels,

walls, wall panels, etc., as well as automobile interior components, including without limitation seats, doors, trim components, etc.

[0030] Figure 1 shows the front side of chair back. In one preferred embodiment, the chair is a Mirra™ chair (available from Herman Miller, Inc., having a place of business in Holland, Michigan, USA). Various embodiments of suitable chairs are described in the following U.S. patent applications: "Tilt chair having a flexible back, adjustable armrests and adjustable seat depth, and methods for the use thereof," serial number 60/356,478, filed February 13, 2002; "Tilt chair having a flexible back, adjustable armrests and adjustable seat depth, and methods for the use thereof," serial number 60/418,578, filed October 15, 2002; "Backrest for a seating structure with an adjustable sacral support," serial number 10/686,554, filed October 14, 2003; and "Tilt chair and methods of use thereof," serial number 10/738,641, filed December 17, 2003; all of which are hereby incorporated in their entireties by reference herein.

[0031] In one embodiment, the chair back 400 has a fabric cover 24 and a securing member 320 around the periphery. The chair back 400 is preferably made of a resilient, compliant material, including various polymeric or plastic materials. For example, in one embodiment, the chair back is molded from polypropylene.

[0032] Figure 2 shows an exploded view of the components of the chair back. The chair back 400 is attached to a chair frame 18. The chair back 400 defines a base element. The chair back 400 has an edge portion 10 formed around at least a portion of the periphery thereof. The edge portion 10 of the chair is generally rounded and enlarged relative to the rest of the chair back. In one embodiment, the edge portion has a thickness of 3 mm while the rest of the chair back has a thickness of 2 mm.

[0033] A first securing member 300 extends around the periphery of the base member. The first securing member 300 includes a channel that is shaped and adapted to fit around the edge portion. A piece of fabric 24 fits over and around the chair back 400. The area of the fabric 24 is slightly larger than the periphery of chair back 400 so that the fabric 24 can overlap at least a portion of, preferably

entirely, the edge portion 10 and the first securing member 300 and be secured thereto. The fabric 24 can be secured to the chair back 400 by a variety of methods, which will be discussed in more detail below.

[0034] In one embodiment, a second securing member 320 is used. The second securing member includes a channel that is shaped and adapted to fit around both the fabric 24 and the first securing member 300, in order to secure the fabric therebetween. A variety of designs and configurations are possible for the first securing member and the second securing member, which will be discussed in detail below. The first and second securing members may be made of any suitable material, and are preferably made of plastic.

[0035] In one embodiment, shown in Figures 3, 4, and 5, a first or inner securing member 300, which is generally U-shaped in cross-section, includes a first arm 302, a second arm 304, and a channel 310 defining an inner surface. The first arm 302 and second arm 304 include inward-facing ridges 306 and 308, respectively. Figure 3 shows a second or outer securing member 320. The second securing member 320 includes a first arm 322, a second arm 324, and a channel 330. The first arm 322 includes a ridge 326, and the second arm 324 includes a ridge 328. The interior area of the channel 330 defined by the second securing member is large enough to fit around the exterior surface of the first securing member 300. The securing members may be made of any suitable material, but are preferably plastic, more preferably, low density polyethylene (LDPE). In one embodiment, the second securing member 320 is made of two materials, an inner thermoplastic layer 334 and an outer thermoplastic elastomer layer 332. In a preferred embodiment, the inner layer is LDPE and the outer layer is Santoprene® thermoplastic elastomer, available from Advanced Elastomers Systems, Akron, OH. In one suitable embodiment, the securing members are made by conventional extrusion techniques, including, for example, co-extrusion of two different materials.

[0036] Figure 5 is a cross sectional view of a first and second securing member disposed on the edge portion of a furniture component. The first securing member 300 is disposed around the furniture component edge portion 10

with the first arm 302 and the second arm 304 positioned on opposite sides of the edge portion 10. The first securing member is preferably made of material sufficiently resilient such that the two arms are biased outwardly and return with a snap fit around the enlarged edge portion, with the ridges 306 and 308 pressing against the edge portion to help to secure the securing member thereto. A piece of fabric 20 is disposed around a portion of the outer surface of the first securing member 300. In one embodiment, the fabric is attached to the first securing member 300. Alternatively, the fabric is not secured to either the first or second securing member but instead is mechanically held in place between the first and second securing members. In yet another embodiment, the fabric is sewn to the securing member, as shown by stitch 350. However, other methods of attachment are possible, including without limitation mechanically fastening (such as stapling or screwing) and bonding (including, without limitation, adhesive bonding, ultrasonic bonding, thermal bonding, etc.). The first securing member 300 may be covered with a second securing member.

[0037] Figure 5 shows a second securing member 320 disposed over the first securing member 300, with the fabric disposed between the two securing members. The second securing member 320 surrounds the outer surface of the first securing member 300. The ridges 326, 328 of the second securing member abut the edge portion 10. The second securing member serves at least two purposes, including securing the fabric 20 to the chair, and providing an aesthetically pleasing outer cover which covers the edge of the fabric. In one embodiment, the first securing member can be omitted altogether, with the second securing member securing the fabric to the edge portion of the base member.

[0038] Figure 6 shows a portion of the seat back 400 of a typical chair upon which the invention may be used. The back 400 of the chair is configured as a base element. The back 400 is preferably made of a resilient, compliant material, and may include a pattern of holes 404 and/or openings 406. The back 400 has an enlarged edge portion 402 which is generally round in cross section and slightly thicker than the body of the back of the chair. The greater thickness of

the enlarged edge 402 facilitates the attachment of the securing member. Figure 7 shows a piece of fabric 20 shaped to fit around the back of a chair. A first securing member 300 is attached to the fabric 20 along the perimeter of the fabric. It should be understood that the first securing member can be configured as type 300 shown in Figure 4, or any of the embodiments disclosed herein. The first securing member 300 is preferably attached to the fabric by sewing, but may be attached by any known method, including without limitation mechanically fastening (such as stapling or screwing) and bonding (including, without limitation, adhesive bonding, ultrasonic bonding, thermal bonding, etc.). The fabric 20 has a recess 24 to account for the attachment of the lower back to the support structure.

[0039] Figure 7A is an enlarged view of the edge of the piece of fabric 20 with the first securing member 300 attached thereto. The first securing member has a cross section previously shown by securing member 300 in Figure 4. The first securing member includes a first arm 302, a second arm 304, and a channel 310 with a slit or a longitudinal opening 462 defining a mouth of the channel. The channel 310 is of sufficient size to fit around the edge of the base element. The arms may be biased away from each other to enlarge the width of the slit and thereby permit attachment of the first securing member 300 around the edge of the base element.

[0040] The second securing member 320 is shown in Figure 8. The second securing member has a cross section previously shown in Figure 3. The second securing member includes a first arm 322, a second arm 324, and a channel 330 with a slit or a longitudinal opening 482 defining a mouth of the channel. The channel 330 is of sufficient size to fit around the first securing member 300. The arms may be biased away from each other to enlarge the width of the slit 482 and thereby permit attachment of the second securing member 320 around the first securing member 300.

[0041] To assemble the fabric attachment device, a fabric piece of suitable size and shape is provided. A first securing member is attached to the periphery of the piece of fabric, by sewing, ultrasonic welding, bonding, mechanically

fastening, or by other attachment methods. The resulting component is shown in Figures 7 and 7A. The first securing member 300 is then attached to the furniture element by inserting the edge of the base element through the longitudinal opening 462 and into the cavity 310. The first securing member may also be, but is not necessarily, attached to the base element by a variety of attachment methods including mechanically fastening (such as stapling or screwing), and bonding (including, without limitation, adhesive bonding, ultrasonic bonding, thermal bonding, etc.). In one embodiment, double-sided tape is used to help secure the first securing member to the base element.

[0042] The first securing member 300 is disposed around the entire edge portion of the base element back, with the ridges 306 and 308 engaging the edge portion. The second securing member 320 is then disposed over the first securing member 300 by positioning the arms of the second securing member around the first securing member. Figure 9 shows the first securing member 300 and the second securing member 320 disposed on the edge portion 402 of a chair back. The piece of fabric 20 is disposed between the two securing members. Figure 10 shows the lower trim cover 500. The lower trim cover 500 covers the two ends of the securing members and is attached to the back of the chair, thereby securing the ends of the two securing members. Figure 11 shows the completely assembled chair back.

[0043] Figure 20 shows an alternative design of a first securing member 510, which is generally U-shaped in cross-section and includes a first arm 530, a second arm 532, a channel 516, and a longitudinal opening 518. The first arm 530 and second arm 532 include inward-facing ridges 514 and 512, respectively. The first securing member has notches 520 spaced along at least a portion of the length of the securing member, preferably at regular intervals. Each notch is defined by opposite sides 522 and 526 and a bottom 524. The notches are preferably formed substantially perpendicular to the longitudinal opening and allow the securing piece to more easily bend around a tight radius of curvature on the base element. The notches 520 may be positioned along the entire length of the securing member, or along only a portion of the length. The width, depth, and

spacing of the notches may be varied from the depicted embodiment, and such variations are intended to be encompassed within the scope of the present invention.

[0044] Figure 12 shows a cross sectional view of the edge portion of a furniture component with a first securing member 30 disposed thereon. The first securing member 30 is generally U-shaped and includes a first arm 32 and a second arm 34. The first securing member 30 is disposed around the edge portion 10 of a base element such that the first arm 32 and a second arm 34 are positioned on opposite sides of the edge portion 10. In one embodiment, the first securing member 30 is further secured to the edge portion 10 by fastening elements 12 and 14. In another embodiment, the fastening elements are not used. The fastening elements, when present, are preferably distributed at regular intervals along the length of the first securing member 30. In one embodiment, the fastening elements 12 and 14 are screws. In another embodiment, the fastening elements 12 and 14 are staples. The second arm 34 includes a ridge 36 which extends radially outward from the edge portion 10. A piece of fabric 20 runs along and is disposed over an outer surface of the first securing member 30. The fabric may be attached to the first securing member by a fastening element 12. The first arm 32 includes a channel 46 which runs along at least a portion of, preferably entirely, the length of the first securing member. The channel 46 is defined by two side members 42 and 44. In one embodiment, one or both of the side members 42 and 44 include barbs 50 and 52 formed at the ends thereof. The channel 46 may be used to facilitate attachment of a second securing member around the first securing member, with the fabric 20 disposed between the two securing members. The barbs 50 and 52 help to secure a portion of a second securing member within the channel 46.

[0045] Figure 13 shows a cross sectional view of an alternative embodiment of a first securing member 60. The first securing member 60 includes a first arm 62 and a second arm 64. The first securing member 60 is disposed around the edge portion 10 such that the first arm 62 and a second arm 64 are positioned on opposite sides of the edge portion 10. In one embodiment, the first securing

member 60 is further secured to the edge portion 10 by fastening elements 14. In another embodiment, the fastening elements are not used. The second arm 64 includes a ridge 66 which extends outwards from the edge portion 10. The first securing member 60 includes a channel 76 which runs along at least a portion of, preferably entirely, the length of the first securing member. The channel 76 is defined by two side members 72 and 74. In one embodiment, one or both of the side members 72 and 74 includes barbs 68 and 70 formed at the ends thereof.

[0046] The first securing member 60 may also include a fabric gripping member 80 that defines a fabric gripping channel 84. The fabric gripping channel 84 runs at least a portion of, preferably entirely, the length of the first securing member 60 and is adapted to hold a piece of fabric 20. In one embodiment, the edge of the fabric 20 is folded such that the fabric 20 runs along the outside of the first securing member 60, into the fabric gripping channel 84, and back out along the fabric gripping member 80, with the free edge disposed outside of the channel 84. In another embodiment, the free edge is disposed within the channel 84. The fabric gripping member 80 includes a barb 82 directed inwards toward the first securing member 60. The barb 82 helps to secure the fabric 20 within the fabric gripping channel 84. The fabric gripping member 80 is preferably sufficiently resilient such that it can be biased outwardly from first securing member 60 when the fabric 20 is inserted within the fabric gripping channel 84, but press inwardly against the fabric after to insertion to keep the fabric 20 within the fabric gripping channel 84.

[0047] Figure 14 shows a cross sectional view of the edge portion 10 of the base element of a furniture component with a first securing member 100 disposed thereon. The first securing member 100 includes a first arm 102 and a second arm 104. The first securing member 100 is disposed around the edge portion 10 such that the first arm 102 and a second arm 104 are positioned on opposite sides of the edge portion 10. In one embodiment, the first securing member 100 is further secured to the edge portion 10 with fastening elements 12. In another embodiment, the fastening elements are not used. The second arm 104 includes a ridge 106 which extends outwardly from the edge portion 10. In one

embodiment, the first arm 102 includes a channel 116 which runs at least a portion of, preferably entirely, the length of the first securing member. The channel 46 is defined by two side members 112 and 120. In one embodiment, the side member 112 includes a barb 122 formed on the end thereof. The other side member 122 may also include a barb formed on the end thereof

[0048] Figure 15 shows a cross sectional view of a second securing member 130 disposed around and secured to the first securing member 100. The second securing member 130 includes a first arm 132 and a second arm 134. The fabric 20 is positioned around the first securing member 100 and, in one embodiment, is secured thereto with a fastener 12. In another embodiment, fasteners are not used. In yet another embodiment, the fabric 20 is secured around the first securing member 100 by the second securing member 130. The second securing member 130 is disposed around the fabric 20 and the first securing member 100 such that the first arm 132 and a second arm 134 are disposed around the first arm 102 and second arm 104 of the first securing member 100. The second arm 134 includes an inwardly facing ridge 140 and a channel 142. The channel 142 engages the ridge 106 of the first securing member. The first arm 132 includes an engaging member 136 that fits within the first channel 116 of the first securing member. The barb 122 interlocks with the engaging member 136 to secure the second securing member around the first securing member.

[0049] Another embodiment of the invention is shown in Figures 16 and 17. Figure 16 shows a cross sectional view of a first securing member 200. The first securing member 200 is generally U-shaped and includes a first arm 202, a second arm 204, and a channel 218 formed therebetween. The first securing member 200 is shaped and adapted to be disposed around the edge portion of the base element of a furniture component such that the first arm 202 and a second arm 204 are positioned on opposite sides of the edge portion. The first arm 202 and the second arm 204 include ridges 206 and 208, respectively, which extend radially outwardly from the arms. The channel 218 includes an interior 210 and a mouth 212. The width 214 of the mouth 212 is smaller than the width 216 of the interior 210 of the first securing member. The first securing member 200 is

preferably resilient so that the arms may be expanded at the opening 212 to fit around the edge portion of a furniture component.

[0050] Figure 17 shows a second securing member 220 adapted to fit around the first securing member 200. The second securing member 220 includes a first arm 222 and a second arm 224. The second securing member 220 is adapted to be disposed around the first securing member 200 with a piece of fabric secured between the two securing members. The interior of the second securing member 220 is shaped so as to generally correspond to the exterior of the first securing member 200. The first arm 222 includes ridges 234 and 242 and a channel 240. The ridge ridges 234 and 242 and channel 240 engage the ridge 206 of the first securing member. Similarly, the second arm 222 includes ridges 232 and 226 and a second channel 228. The ridges 232 and 226 and the second channel 228 engage the ridge 208 of the first securing member 200.

[0051] Although the embodiment shown in Figures 16 and 17 has ridges on the first securing member 200 and corresponding channels on the second securing member 220, it will be apparent that other methods of engaging the first and second securing members are possible. For example, the first securing member can have a channel in its outer surface, with a corresponding ridge in the second securing member to engage the first securing member and secure a piece of fabric between the two securing members.

[0052] Figure 18 shows a cross sectional view of a first securing member 150 according to another aspect of the invention. The first securing member 150 includes a first arm 152, a second arm 154, and a channel 158 formed therebetween. The first securing member 150 is shaped and adapted to be disposed around the edge portion of the base element of a furniture component such that the first arm 152 and a second arm 154 are positioned on opposite sides of the edge portion. The first securing member 150 includes a second channel 174 which runs at least a portion of the length of the first securing member and is adapted to hold a piece of fabric. In one embodiment, the fabric channel 174 runs along the entirety of the first securing member. The channel 174 is defined by the first arm 152 and a gripping member 170. In one embodiment, the gripping

member 170 includes a lip 172. The fabric is disposed over at least a portion of the outer surface of the first securing member 150 and is inserted into the channel 174. The gripping member 170 may be resilient so that it can move outwardly from first securing member 150 when the fabric is inserted within the channel 174, but press inwardly to keep the fabric 20 within the channel 174. The second arm 154 includes a ridge 156 extending radially outwardly from the second arm 154. The channel 158 includes an interior 162 and a mouth 168. The mouth 168 defines a width 166 which is smaller than the width 164 of the interior 162 of the first securing member.

[0053] Figure 19 shows a second securing member 180 adapted to fit around the first securing member 150 of Figure 18. The second securing member 180 includes a first arm 182 and a second arm 184. The second securing member 180 is adapted to be disposed around the first securing member 150 with a piece of fabric secured between the two securing members. The interior of the second securing member 180 is shaped so as to generally correspond to the exterior of the first securing member 150. The first arm 182 includes a flat surface 198 and a ridge 186 which defines a channel 190. The channel 190 and the flat surface 198 engage the gripping member 170 of the first securing member. The second arm 184 includes a second ridge 188 and a second channel 194. The second ridge 188 and second channel 194 engage the ridge 156 of the first securing member 200.

[0054] Although the embodiment shown in Figures 18 and 19 has a ridge on the first securing member 150 and corresponding channel 194 on the second securing member 180, it will be apparent that other methods of engaging the first and second securing members are possible. For example, the first securing member can have a channel in its outer surface, with a corresponding ridge in the second securing member to engage the first securing member and secure a piece of fabric between the two securing members.

[0055] In one series of embodiments, the elements of first securing members 300, 510, 30, 60, 100, and 200 are integrally formed on the edge portion of the base member. For example, turning to Figure 13, arms 62 and 64, ridge 66, side members 72 and 74, and fabric gripping member 80 can be integrally formed in

the edge portion 10 of the base element. Likewise, turning to Figure 14, arms 102 and 104, ridge 106, and side member 112 can be integrally formed in the edge portion 10 of the base element. Likewise, turning to Figure 18, arms 152 and 154, ridge 156, and gripping member 170 can be integrally formed in the edge portion 10 of the base element.

[0056] Although many of the embodiments herein refer to the back of a chair, the present invention may also be used for other parts of a chair, such as the seat or arms, or other furniture components. The present invention may also be used to secure fabric to other types of furniture and furniture components.

[0057] The embodiments described above and shown herein are illustrative and not restrictive. In certain cases, materials of construction have not been described; in these cases, it is to be understood that the invention may be made by any known method and of any known material. The scope of the invention is indicated by the claims rather than by the foregoing description and attached drawings. The invention may be embodied in other specific forms without departing from the spirit of the invention. Accordingly, these and any other changes which come within the scope of the claims are intended to be embraced therein.